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Preparation of Milk for Reprocessing

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Annotation: This article evaluates the nutritional components and auxiliary materials of each batch of natural dairy products brought into production in accordance with the regulatory and technical documents for these products. The main attention is paid to the correct determination of the acidity and density of milk and cream sent for condensation and drying.

Keywords: natural milk, milk, dairy products and canned milk, technological instructions, standards for prepared milkd.

Introduction. There is no doubt that milk is invaluable for the human body both in its pure form and in the finished products obtained as a result of its processing. That is why milk has been considered the most important source of nutrition since ancient times. Today, the amount of dairy products produced in various categories of farms in our Republic cannot fully satisfy the population's need for milk. That is why any research aimed at increasing the milk productivity of cows is considered important and indicates the relevance of the issue.

Cattle differ from each other in milk productivity. The productivity of cows often depends on their breed, the norm and type of feeding, and the conditions of keeping and care. Even cows of the same breed, kept in the same conditions, differ in productivity, which can be explained by the individual, i.e., unique characteristics of cows and their hereditary factors. The chemical composition and nutritional value of milk depend on many factors listed above and vary in different breeds. The composition and nutritional value of milk vary depending on the lactation period, health, feeding standards and type of cows. The most complete products created by nature itself and constantly necessary for people of all ages are milk, dairy products and canned milk. Canning of milk began in the USA in 1845, in Europe in 1866, and in Russia in 1881. Canned milk is a specially processed milk that has the ability to be stored for a long time without spoiling, and is very convenient for packaging, wrapping, long-distance transportation, long-term storage as

a concentrate with high nutritional and biological value, and quickly restores its original state after dissolving in water at the appropriate concentration.

To obtain high-quality canned products, milk that meets the technological instructions for canned milk and the requirements of the standards for the prepared milk is used.

Materials and methods. An analysis of the data presented in the literature shows that canned milk has the following advantages over milk: it is easy to transport, easy to store, a large amount of nutrients are concentrated in small cans, they can be stored for a long time, and accordingly, seasonality in feeding the population with milk and dairy products is eliminated. When canned milk is dissolved in water, the original properties of milk are restored.

Milk is preserved by sterilization, drying and adding sugar. Depending on the method used in canning milk, canned milk is divided into concentrated sterile canned, concentrated sugared and dry canned. Canned milk is divided into condensed and dry milk products according to the raw materials, materials and preparation method used.

When conducting research on the organization of production control of condensed milk products, the need to determine the ratio in each batch of milk by determining the amount of dry milk residue, protein and fat in the milk entering the processing was shown; a method for calculating the standardization of milk in the production of condensed milk with sugar was proposed and the economic efficiency of the composition for this product was determined. Depending on the method used in canning milk, canned milk is divided into condensed sterile canned, condensed sugared and dry canned. The production of any type of canned milk necessarily requires the removal of water from milk and the concentration of dry matter.

Result and discussion.

The technological process of producing condensed milk with sugar and fat consists of operations common to all canned milk (receiving milk, cleaning, cooling, temporary storage, normalization, pasteurization and condensation) and specific operations (calculating the required amount of sugar, preparing sugar syrup, adding it to milk during condensation, cooling the product, packaging and storing it).

The following primary raw materials are used for the production of dairy-based canned products:

Milk raw materials according to GOST 13264-88; buttermilk obtained during the production of sweet cream butter; sugar according to GOST 21-94; refined sugar according to GOST 22-94; milk sugar as per technical documentation; natural coffee according to GOST 6805-85; cocoa powder according to GOST 108-76;

Stabilizing salts: sodium carbonate (E 500) according to GOST 4201-79, sodium bicarbonate (E 500) according to GOST 2156-76, sodium citrate (E 331) according to GOST 22280-76, sodium phosphate (E 339) according to GOST 9337-79, etc.;

Antioxidants: ascorbic acid (E 300), sodium ascorbate (E 301), potassium ascorbate (E 301), etc.; food flavorings; food colorants.

Each batch of incoming raw materials, food components, and auxiliary materials is evaluated according to the relevant regulatory and technical documents. Particular attention is given to correctly determining the acidity and density of milk and cream sent for concentration and drying. Based on these indicators, the mass fraction of dry substances in raw milk is determined, which is then used to standardize the milk and calculate the required amount of sugar and other additives.

Once every ten days, the mass fraction of dry matter in the composite sample is determined analytically and compared to the results obtained by calculation. For sterilized sweetened condensed milk production, the milk is additionally tested for heat resistance.

Organoleptic indicators of sweetened condensed milk products must include a sweet, clean taste without any foreign flavors or odors, and clearly expressed pasteurized milk or cream taste (for

sweetened condensed cream). The consistency should be homogeneous, without organoleptically noticeable lactose crystals, and the color should be uniformly creamy-white. The physicochemical indicators of the canned product must comply with the requirements specified in the relevant standards.

Table 1. Standardization indicators of canned condensed milk

Product	Mass fraction, %				Acidity, ^{0}T, not high
	humidity, not much	milk solids, not less	sugar, not less	fat, not less	
Condensed milk and cream with sugar (GOST 31688-2012)*:	30,0 26,5 26,0	26,0 28,5 37,0	44,0-46,0 43,5-45,5 37,0-39,0	Not more than 1.0 8.5 19.0	60,0 48,0 40,0
-Skimmed milk with sugar	30,0	14,0	37,0-47,0	2,0-20,0	40,0-60,0
-Skimmed milk with sugar	26,5	28,0	43,5	8,5	48,0
-Skimmed cream with sugar	30,0	26,0	-	44,0	60,0
Canned condensed milk with sugar: with sugar, cooked with sugar, with sugar and nutritional and flavoring components (GOST 31703-2012)**	26,0	36,0	19,0	40,0	40,0
Skimmed milk with sugar (GOST 2903-78)	27,5	28,5	7,5	43,5	-
Skimmed milk with sugar (GOST 4771-60)	29,0	27,0	7,0	44,0	-

The batch of raw materials imported from farms was evaluated in accordance with the requirements of the regulatory technical documentation for these products.

The shelf life of milk is also affected by its storage period before processing. In particular, milk stored for more than 12 hours becomes unsuitable for condensation and sterilization. Colostrum obtained up to 7 days after calving has a high content of whey proteins, which has low heat resistance and is not allowed to be used for processing canned milk.

The heat resistance of milk also decreases when the salt balance is disturbed. The salt balance of milk is affected by the feeding ration, lactation periods, breed of cattle, etc.

When assessing the suitability of milk raw materials for the production of canned milk, it is necessary to correctly determine the density of milk and cream sent for condensation. We calculate the YQSQ according to these indicators, based on which milk is normalized and the required amount of sugar is calculated. Once a decade (10 days), the amount of dry matter in a combined sample of milk is determined analytically and the result is compared with the data obtained by calculation.

Based on the nature of preservation, in order to obtain stable canned milk, the milk used in the production of canned milk must be bacterially pure. For bacteriological studies, a combined milk sample was used, taken and prepared for analysis in accordance with the rules in accordance with the standard GOST 13928-84 - “Milk and cream for processing. Rules for acceptance, methods of taking samples and preparing them for analysis”.

Table 2. Bacteriological indicators of milk

№	Bakterial ifloslanganligi	
	Number of microorganisms in 1 cm3 of milk	Class
1.	From 500 thousand to 4 million	II
2.	Up to 500 thousand	I
3.	Up to 500 thousand	I
4.	Up to 500 thousand	I
5.	From 4 million to 20 million	III

The determination of the amount of milk received is carried out after sampling and determining the types of milk. The mass of milk is determined by weighing on scales. Before being fed to the scales, the milk is filtered using boards, lavsan and other materials. The results of the quality assessment and the amount of milk received are recorded in the appropriate journals, after which the milk is sent for cleaning and cooling.

Separators-milk cleaners, bactofuges and separator-clarifiers are used to clean the milk from mechanical impurities. Milk cooling is carried out in plate and tube coolers.

Conclusion. Milk cooling is carried out in plate and tube coolers. Milk sent for short-term storage is cooled to a temperature of 2-60C. The cooled milk is stored in horizontal or vertical tanks (vessels). During storage, the acidity and temperature of milk should be determined periodically every 2 hours. Milk processed into canned milk is stored for 4-12 hours. The quality of milk and canned goods produced from it is greatly reduced due to the development of psychrophilic proteolytic and lipolytic microorganisms in milk stored in a refrigerated state for a long time. Therefore, it is not recommended to store refrigerated milk for a long time.

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